Waste Management

Transuranic Waste

. . .at the Nevada Test Site

Background

Transuranic waste is one of several types of waste handled by the U.S. Department of Energy Nevada Site Office at the Nevada Test Site. Transuranic waste contains man-made radioactive elements heavier than uranium, hence the name "trans" or "beyond" uranium. Transuranic waste that contains both radioactive and hazardous* components is referred to as mixed transuranic waste and is managed in accordance with a signed agreement between the U.S. Department of Energy (radioactive component) and the state of Nevada (hazardous component).

Most of the transuranic waste currently stored at the Nevada Test Site was generated as part of a U.S. nuclear weapons research and development program at Lawrence Livermore National Laboratory near Oakland, California. This legacy waste, which was shipped to the Nevada Test Site for temporary storage between 1974 and 1990, includes protective clothing and miscellaneous equipment contaminated with transuranic elements. Additionally, a small quantity of the transuranic waste stored at the Nevada Test Site was generated by environmental restoration activities on the Nevada Test Site and the Tonopah Test Range.

Waste Handling and Storage

Most transuranic elements decay by emitting alpha particles. Alpha radiation, the least penetrating form of radiation, can be stopped by a sheet of paper and cannot penetrate human skin. However, an alpha-emitting isotope can enter the body through inhalation, ingestion, or through a cut on the skin. Therefore, transuranic waste requires special handling, storage, and disposal.

Approximately 23,700 cubic feet of transuranic and mixed transuranic waste were received at the Nevada Test Site to be stored and characterized. The waste is contained in metal drums and metal boxes which are housed in a steel-framed, fabric-covered building at the Area 5 Radioactive Waste Management Site. This structure rests on a 2.1-acre asphalt pad, which contains a protective waterproof layer to prevent moisture from seeping into the soil as well as an 8-inch curb to prevent run-on and runoff. Nevada Site Office waste management specialists further ensure safety by regularly inspecting waste packages to verify that labels are intact and legible and that the containers remain structurally sound. Access to the facility is also controlled. These precautions are part of a comprehensive health and safety program designed to protect Nevada Test Site personnel, the public, and the desert environment.

* The term ***hazardous*** *waste*, as defined by the U.S. Environmental Protection Agency, refers to waste that is harmful to human health or the environment. Substances such as ethyl alcohol, Freon, and various metals are considered hazardous waste.

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Waste Characterization

Transuranic and mixed transuranic waste stored at the Nevada Test Site is destined for permanent disposal at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. In order for the waste to be accepted for disposal at WIPP, each waste package must be characterized and certified in accordance with the WIPP waste acceptance criteria.

An extensive characterization program designed to identify the physical and chemical components of the waste products is in place at the Waste Examination Facility (WEF) located just outside the Nevada Test Site Radioactive Waste Management Site. Within the WEF, waste specialists perform several separate characterization processes on the waste. Designated waste may also be processed through the Visual Examination and Repackaging Building (VERB) glovebox, which allows personnel to open, inspect, sort, and repackage transuranic waste without direct contact. The VERB's closed, secure environment includes high-efficiency particulate air filters to ensure that all building exhaust being released to the atmosphere meets air quality standards.

The Waste Isolation Pilot Plan (WIPP), located near Carlsbad, New Mexico, is the world's first underground repository licensed to permanently dispose of transuranic waste. Disposal rooms at the WIPP are mined to depths of 2,150 feet below the surface and are surrounded by a 2,000-foot thick salt formation that has been stable for more than 200 million years.

Waste Transportation to WIPP

Transuranic waste, once certified, is shipped inside specially designed containers provided by WIPP. These containers, known as *Transuranic Package Transporter Model II* (TRUPACT-II), can hold up to 14 fifty-five gallon waste drums, two standard waste boxes, or one 10-drum overpack. Each truck can transport up to three TRUPACT-II containers at one time. All waste shipments must meet stringent U.S. Nuclear Regulatory Commission and U.S. Department of Transportation requirements before transport. Decisions regarding routes are determined following extensive negotiations with the states in which proposed routes are located. The WIPP assumes official responsibility for Nevada Test Site transuranic waste once it has been loaded into the TRUPACT-II containers. Transuranic waste shipments will begin when equipment schedules are in place and routing decisions are finalized.

TRUPACT-II containers in use during mobile loading demonstration.

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